

FORMULARIO DE ESTADÍSTICA IESTADÍSTICA DESCRIPTIVA

$$\sigma^2 = \frac{x_1^2 + x_2^2 + \dots + x_N^2}{N} - \mu^2$$

$$MDA = \frac{|x_1 - \mu| + |x_2 - \mu| + \dots + |x_N - \mu|}{N}$$

$$s^2 = \frac{(x_1^2 + x_2^2 + \dots + x_n^2) - n\bar{x}^2}{n-1}$$

$$MDA = \frac{|x_1 - \bar{x}| + |x_2 - \bar{x}| + \dots + |x_n - \bar{x}|}{n}$$

$$Re = x_n - x_1$$

$$Ri = C_3 - C_1$$

$$\sigma^2 = \frac{\sum_{i=1}^k f_i (m_i - \mu)^2}{N}$$

$$Me = \liminf .R_i + \frac{\frac{N}{2} - F_{i-1}}{f_i} h_i$$

$$s^2 = \frac{\sum_{i=1}^k f_i (m_i - \bar{x})^2}{n-1}$$

$$Me = L + \left( j - \frac{1}{2} \right) \left( \frac{U - L}{f} \right)$$

$$CV = \frac{\sigma}{x} 100$$

$$Mo = \liminf .R_j + \frac{f_{j+1}}{f_{j+1} + f_{j-1}} h_j$$

$$A = \frac{(C_3 - C_2) - (C_2 - C_1)}{C_3 - C_1}$$

$$P_k = \liminf .R_i + \frac{\frac{KN}{100} - F_{i-1}}{f_i} h_i$$

$$A_s = \frac{\bar{x} - M_\sigma}{\sigma}$$

NÚMEROS ÍNDICE

$$I_0^T = \frac{x_u}{x_{i0}} 100$$

$$\bar{I} = \frac{I_1 + I_2 + \dots + I_N}{N}$$

$$I^* = \frac{I_1 W_1 + I_2 W_2 + \dots + I_N W_N}{W_1 + W_2 + \dots + W_N}$$

$$I_G = \sqrt[n]{I_1 I_2 \dots I_N}$$

$$I_G^* = \sqrt[n]{I_1^{W_1} I_2^{W_2} \dots I_N^{W_N}}$$

$$I_A = \frac{x_{1t} + x_{2t} + \dots + x_{Nt}}{x_{10} + x_{20} + \dots + x_{N0}}$$

$$I_A^* = \frac{x_{1t} w_1 + x_{2t} w_2 + \dots + x_{Nt} w_N}{x_{10} w_1 + x_{20} w_2 + \dots + x_{N0} w_N}$$

Laspeyres: 
$$L_p = \frac{\sum p_{it} q_{i0}}{\sum p_{i0} q_{i0}}$$

$$L_q = \frac{\sum p_{i0} q_{it}}{\sum p_{i0} q_{i0}}$$

Paasche: 
$$P_p = \frac{\sum p_{it} q_{it}}{\sum p_{i0} q_{it}}$$

$$P_q = \frac{\sum p_{it} q_{it}}{\sum p_{it} q_{i0}}$$

Factor de conversión:  $\frac{I_K}{100}$

## PROBABILIDAD

$$C_n^r = \frac{n!}{r!(n-r)!}$$

$$V_n^r = \frac{n!}{(n-r)!}$$

$$P_n = n!$$

$$CR_n^r = C_{n+r-1}^r = \frac{(n+r-1)!}{r!(n-1)!}$$

$$VR_n^r = n^r$$

$$P_n^{r_1, r_2, \dots, r_k} = \frac{n!}{r_1! r_2! \dots r_k!}$$

$$P(A/B) = \frac{P(A \cap B)}{P(B)}$$

$$P(A \cap B) = P(A/B)P(B)$$

$$P(B/A) = \frac{P(A/B)P(B)}{P(A)}$$

$$P\left(\frac{E_i}{R}\right) = \frac{P(E_i)P\left(\frac{R}{E_i}\right)}{P(E_1)P\left(\frac{R}{E_1}\right) + \dots + P(E_n)P\left(\frac{R}{E_n}\right)}$$

$$E(x) = \mu_x = x_1 p_1 + x_2 p_2 + \dots + x_n p_n = \sum x \cdot p(x)$$

$$\sigma_x^2 = E[(x - \mu_x)^2] = \sum_x (x_i - \mu_x)^2 P(x_i)$$

$$\sigma_x^2 = E(x^2) - \mu_x^2 = \sum_x x_i^2 P(x_i) - \mu_x^2 = (E(x))^2$$

$$\sigma_x = +\sqrt{\sigma_x^2}$$

$$E(xy) = \sum x_i y_j P[x = x_i; y = y_j]$$

$$E\left(\frac{x}{y}\right) = \sum x_i P\left(\frac{x_i}{y_j}\right) = x_1 P\left(x = \frac{x_1}{y}\right) + x_2 P\left(x = \frac{x_2}{y}\right) + \dots$$

$$\text{Cov}(x, y) = E[(x - \mu_x)(y - \mu_y)] = \sum \sum (x_i - \mu_x)(y_j - \mu_y) f(x_i, y_j)$$

$$\text{Cov}(x, y) = E(xy) - E(x)E(y)$$

## DISTRIBUCIONES DE PROBABILIDAD

Distribución de Bernoulli:

$$E(x) = \mu_x = P$$

$$\sigma_x^2 = P(1-P)$$

Distribución Binomial:

$$P(x = k) = C_n^k P^k q^{n-k}$$

$$q = 1-P$$

$$E(x) = np$$

$$\text{Var}(x) = npq$$

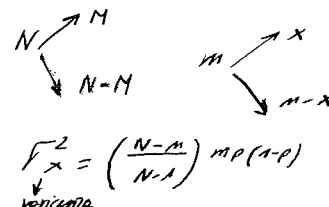
Distribución Hipergeométrica:

$$P(x = k) = \frac{C_M^x C_{N-M}^{n-x}}{C_N^n} \quad P(X=x) = \frac{\binom{M}{x} \binom{N-M}{n-x}}{\binom{N}{n}}$$

$$P(x = k) = \frac{C_K^R C_{n-k}^{N-R}}{C_n^N}$$

$$E(x) = np$$

proporción de éxito



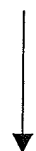
Distribución de Poisson:

$$P(x = k) = \frac{e^{-\lambda} \lambda^k}{k!}$$

$$E(x) = \lambda$$

$$\text{Var}(x) = \lambda$$

X → B(n, p)



Si:  $n > 20$   
 $p < 0.05$

$$X \rightarrow P(\lambda = np) = \frac{e^{-\lambda} \lambda^k}{k!}$$

$$E(x) = \int_{-\infty}^{+\infty} x \cdot f(x) dx$$

$$g(x) = \int_{-\infty}^{+\infty} f(x, y) dy$$

$$\text{Var}(x) = E[(x - \mu_x)^2]$$

$$g(y) = \int_{-\infty}^{+\infty} f(x, y) dx$$

$$\text{Var}(x) = E(x^2) - [E(x)]^2$$

$$E(x^2) = \int_{-\infty}^{+\infty} x^2 \cdot f(x) dx$$

$$\text{Cov}(x, y) = E[(x - \mu_x)(y - \mu_y)]$$

$$\text{Cov}(x, y) = E(xy) - \mu_x \mu_y$$

Distribución normal:

v.a.x  $\rightarrow N(\mu, \sigma)$

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2} \quad -\infty < x < +\infty$$

$$F(x) = \int_{-\infty}^x \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2} dx$$

$$E(x) = \mu_x$$

$$\text{Var}(x) = \sigma_x^2$$

v.a.z  $\rightarrow N(0, 1)$

$$f(z) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}z^2} \quad -\infty < z < +\infty$$

$$F(z) = P[z \leq z_i] = \int_{-\infty}^{z_i} \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}u^2} du$$

$$E(z) = \mu_z = \int_{-\infty}^{+\infty} z \cdot f(z) dz = 0$$

$$\sigma_z^2 = 1$$

Distribución Exponencial:

$$f_x(x) = \frac{e^{-x/\mu}}{\mu} \quad x \geq 0$$

$$F_x(x) = 1 - e^{-x/\mu} \quad x \geq 0$$

Aproximaciones:

v.a.x  $\rightarrow B(n, p)$



Si:  $np \geq 5$   
 $n(1-p) \geq 5$

z  $\rightarrow N(0,1)$

$$z = \frac{(x - np) \pm \frac{1}{2} u.m.}{\sqrt{np(1-p)}}$$

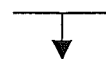
v.a.x  $\longrightarrow$  H (M,N,n)



Si:  $np \geq 5$   
 $n(1-p) \geq 5$

z  $\longrightarrow$  N (0,1)

$$z = \frac{(x - np) \pm \frac{1}{2} u.m.}{\sqrt{np(1-p)} \sqrt{\frac{N-n}{N-1}}}$$



No si  $n < 0.05N$

v.a.x  $\longrightarrow$  P( $\lambda$ )



Si:  $\mu = \lambda > 5$

z  $\longrightarrow$  N (0,1)

$$z = \frac{(x - \lambda) \pm \frac{1}{2} u.m.}{\sqrt{\lambda}}$$

## DISTRIBUCIONES MUESTRALES

$$\left\{ \begin{array}{l} \bar{x} \rightarrow N\left(\mu_x; \frac{\sigma_x}{\sqrt{n}}\right) \\ \frac{\bar{x} - \mu_x}{\sigma_x / \sqrt{n}} = z \end{array} \right. *$$

$$\left\{ \begin{array}{l} \bar{x} \rightarrow N\left(\mu_x; \frac{\sigma_x}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}}\right) \\ \frac{\bar{x} - \mu_x}{\frac{\sigma_x}{\sqrt{n}} \sqrt{\frac{N-n}{N-1}}} = z \end{array} \right. *$$

$$\left\{ \begin{array}{l} \bar{x} \rightarrow N\left(\mu_x; \frac{s_x}{\sqrt{n}}\right) \\ \frac{\bar{x} - \mu_x}{s_x / \sqrt{n}} = t_{(n-1)} \end{array} \right. *$$

$$\left\{ \begin{array}{l} \bar{x} \rightarrow N\left(\mu_x; \frac{s_x}{\sqrt{n}} \sqrt{1 - \frac{n}{N}}\right) \\ \frac{\bar{x} - \mu_x}{\frac{s_x}{\sqrt{n}} \sqrt{1 - \frac{n}{N}}} = t_{(n-1)} \end{array} \right. \quad *$$

$$\left( \frac{(n-1)s_x^2}{\sigma_x^2} = \chi_{(n-1)}^2 \right) \quad *$$

$$\left\{ \begin{array}{l} (\bar{x} - \bar{y}) \rightarrow N\left(\mu_x - \mu_y; \sqrt{\frac{\sigma_x^2}{n_x} + \frac{\sigma_y^2}{n_y}}\right) \\ \frac{(\bar{x} - \bar{y}) - (\mu_x - \mu_y)}{\sqrt{\frac{\sigma_x^2}{n_x} + \frac{\sigma_y^2}{n_y}}} = z \end{array} \right.$$

$$\left\{ \begin{array}{l} (\bar{x} - \bar{y}) \rightarrow N\left(\mu_x - \mu_y; \sigma \sqrt{\frac{1}{n_x} + \frac{1}{n_y}}\right) \\ \frac{(\bar{x} - \bar{y}) - (\mu_x - \mu_y)}{\sigma \sqrt{\frac{1}{n_x} + \frac{1}{n_y}}} = z \end{array} \right.$$

$$\left\{ \begin{array}{l} \frac{(\bar{x} - \bar{y}) - (\mu_x - \mu_y)}{s_p \sqrt{\frac{1}{n_x} + \frac{1}{n_y}}} = t_{n_x + n_y - 2} \\ s_p^2 = \frac{(n_x - 1)s_x^2 + (n_y - 1)s_y^2}{n_x + n_y - 2} \end{array} \right.$$

$$\left\{ \begin{array}{l} \frac{(\bar{x} - \bar{y}) - (\mu_x - \mu_y)}{\sqrt{\frac{s_x^2}{n_x} + \frac{s_y^2}{n_y}}} = t_k \\ k = \frac{(n_x - 1)(n_y - 1)}{(n_y - 1)c^2 + (1 - c)^2(n_x - 1)} \\ c = \frac{s_x^2 / n_x}{s_x^2 / n_x + s_y^2 / n_y} \end{array} \right.$$

$$\left( \frac{\bar{d} - (\mu_x - \mu_y)}{s_d / \sqrt{n}} = t_{n-1} \right)$$

$$\left\{ \begin{array}{l} \hat{P}_x \rightarrow N \left( \hat{P}_x, \sqrt{\frac{\hat{P}_x(1-\hat{P}_x)}{n}} \right) \text{ D.P.N} \\ \frac{\hat{P}_x - P}{\sqrt{\frac{\hat{P}_x(1-\hat{P}_x)}{n}}} = z \quad \neq \end{array} \right.$$

$$\left\{ \begin{array}{l} (\hat{P}_x - \hat{P}_y) \rightarrow N \left( \frac{P_x - P_y}{n_x} + \frac{\hat{P}_y(1-\hat{P}_y)}{n_y} \right) \\ \frac{(\hat{P}_x - \hat{P}_y) - (P_x - P_y)}{\sqrt{\frac{\hat{P}_x(1-\hat{P}_x)}{n_x} + \frac{\hat{P}_y(1-\hat{P}_y)}{n_y}}} = z \end{array} \right.$$

